A New Insight into the Morphological Changes of Escherichia coli Treated by Antibacterial Compound from Lactobacillus plantarum HKN01 by Transmission Electron Microscopy

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Background & Objectives: Antibacterial compound produced by lactic acid bacteria are gaining increased importance due to their activity against undesirable microorganisms. These kind of antibacterial compound have different mechanisms to inhibit pathogenic bacteria, in this article morphological changes caused by *Lactobacillus plantarum* antibacterial compound against *E. coli* has been studied by electron microscopy.

Methods: Transmission electron microscopy images of ultrathin sections prepared from *E. coli* treated with the antibacterial compound and grown at different time-points began to show extensive morphological changes after 2 hours incubation. In contrast, the control samples grown under the same conditions showed no morphological changes at any time-point.

Results: The cultures exposed to the antibacterial compound contained a mixture of two distinct E. coli; one with morphology similar to the control containing white spots suggesting cytoplasmic damage and the other completely altered with a clear change of shape and size as well as structural modification of the cell wall.Owing to a different response to staining, the completely altered bacteria appear much darker compared to the less altered bacteria suggesting a change in the cytoplasmic composition. There are also some membrane bound convoluted structures visible within the completely altered bacteria. Which can be attributed to the response of the E. coli to the treatment with the antibacterial compound, The altered bacteria show a relatively thick cell wall and in some cases having a multi-cytoplasmic membrane. A polymeric precipitate covers the outer surface of the altered bacteria.

Conclusion: Transmission electron microscopy (TEM) analysis of antibacterial compounds-treated *E. coli* demonstrated that the completely altered bacteria appear much darker compared to the less altered bacteria suggesting a change in the cytoplasmic composition. There are also some membrane bound convoluted structures visible within the completely altered bacteria which can be attributed to the response of the *E. coli* to the treatment with the antibacterial compound. The altered bacteria show a relatively thick cell wall and in some cases having a multi-cytoplasmic membrane.

Keywords: Lactobacillus, HKN01, *Escherichia coli*